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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/531,129

07/26/2005

Alexander Gutsol

4264.73438

4959

24978 7590 08/21/2008

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EXAMINER

NGUYEN, NGOC YEN M

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

08/21/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/531,129	Applicant(s) GUTSOL ET AL.	
	Examiner Ngoc-Yen M. Nguyen	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/10/2005</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-15 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method having a destruction and removal efficiency (DRE) of about 90% or more for certain VOC compounds, such as acetone or methanol, and at a higher water spray rate, does not reasonably provide enablement for high DRE for all VOCs at low water spray rate of "about 0.2 milliliters/minute". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

In Futamura et al, "Towards Understanding of VOC Decompositions Mechanisms Using Nonthermal Plasmas", Industry Applications Conference, 1995. Thirtieth IAS Annual Meeting, IAS '95., Conference Record of the 1995 IEEE, Orlando, FL, Oct. 8-12, 1995, Vol. 2, Oct. 8, 1995, pp. 1453-58, it is shown that water depressed TCE decomposition efficiency (note abstract), thus, when the VOC is TCE (trichloroethylene), the water spray droplets or film as required in the instant claims would not promote a high DRE.

It is also noted the presence of the water film or water spray helps remove soluble VOC components so the pulsed corona discharge is only used for treatment of

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insoluble VOC (note instant specification, page 22, middle paragraph), thereby reducing the expenditure per molecule of VOC removed. However, the VOCs in the instant claims are required to include any "soluble VOC components", when there is no such soluble VOC components in the exhaust gas, the instant specification has not provided any disclosure to teach how insoluble VOC components can be removed by using pulsed corona discharge in the presence of the water film with high DRE at low expenditure as required in step c) of the independent claims.

Also, as shown in Figures 2 (for methanol) and 3 (for acetone), at 0.2 ml/min of water flow rate, the DRE for methanol and acetone are less than 10% and about 5%, respectively. These values are way below the required "about 90% or more" or "99% or more" in the instant claims.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over S. Masuda et al., "Novel Plasma Chemical Technologies-PPCP and SPCP for Control of Gaseous Pollutants and Air Toxics", Journal of Electrostatics, Vol. 34, No. 4, May 1995, pp. 415-438, optionally in view of Schiffner (5,861,123) and Makin et al (4,181,675).

Masuda et al disclose a pulse corona induced plasma chemical process (PPCP) for control of gaseous pollutants (NO_x , SO_x , VOCs) and air toxics as well as odors (note abstract). PPCP uses nanosecond pulse coronas in a corona reactor in combination with a nanosecond high-voltage pulse power supply with pulse frequency of 50-250 Hz (0.05-.25 kHz) (note page 416, third full paragraph from bottom).

The great advantages of PPCP are it is very simple in construction and their overall cost, both initial and running, is one of the lowest among many other processes.

For PPCP, there are several aspects to be carefully considered, one of which is the removal of the reaction products from the gas phase to avoid the reverse reaction. This can be a water film formed on the reactor wall to absorb the reaction products (note item (4)(d) on page 419).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a water film on the reactor wall for the process of Masuda et al to promote the removal the reaction products. For the actual ratio of the water flow to the gas flow, it would have been obvious to one skill in the art to optimize such ratio to obtain the highest destruction and removal efficiency.

Optionally, Schiffner '123 can be applied to teach the need to remove trace amounts of methanol from pulp mill bleach plant emissions (note column 10, lines 34-37). The "trace amount" fairly suggests that the amount of methanol in the emissions is low, i.e. in ppm range, as required in the instant claims 4, 8, 11.

Optionally, Makin '675 can be applied to teach that methanol vapor, i.e. methanol in a gaseous stream, can be removed by scrubbing with water (note column 2, lines 31-34).

It would have been obvious to use the process of Masuda et al to remove methanol, which is a VOC, as suggested by Schiffner '123 in the presence of a water film because such water film would facilitate the removal of methanol as suggested by Makin '675.

Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sobacchi et al, "Experimental assessment of non-thermal plasma techniques for removal of paper industry VOC emissions", 15th International Symposium on Plasma Chemistry, Orleans, July 9-13, 2001. Symposium Proceedings, Vol. VII: poster contributions, pp. 3135-3140) (taken from <http://plasma.mem.drexel.edu/publications/>), optionally further in view of Makin '675.

It should be noted that the Sobacchi is available as a reference under 35 USC, 102(b) for all claims because there is no support for the following limitations in the provisional application 60/367231, therefore, the earliest effective filing date for all claims is the filing date of the PCT/US03/09089, i.e. March 24, 2003:

- "about 90 percent *or more*" in claims 1, 6 and 10, "or more" would include values such as 100% that is not supported by the specification (including the Figures);
- "0.1 to about 1 kHz" in claims 3, 6 and 10;

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- “about 60 to about 6000 ppm VOC” in claims 4 and 6;
- “ about 40°C to about 65°C” in claims 7 and 10;
- “about 4200 VOC” in claims 8 and 10;
- “300 to about 3000 ppm VOC” in claim 11;
- “about 99 percent *or more*” in claim 12, same reason as stated above or “or more”;
- “oriented strandboard production” in claim 13.

Sobacchi discloses a process using non-thermal plasma techniques for treating of volatile organic compounds (VOCs) emissions from the paper industry (note abstract). The gas compositions are listed in Table 1. The amounts of VOCs listed in Table 1 overlaps the claimed ranges. With respect to the encompassing and overlapping ranges previously discussed, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time of invention to select the portion of the prior art's range which is within the range of the applicants' claims because it has been held prima facie case of obviousness to select a value in a known range by optimization for the results. *In re Boesch*, 205 USPQ 215. Additionally, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness. *In re Malagari*, 182 USPQ 549.

In the experiments, pulse frequency was varied between 266 Hz and 1450 Hz (0.266 to 1.45 kHz). A water flow rate equal to 0.25 ml/min was provided and the gas flow rate was 2 SLM (note third page of the article, first full paragraph).

The temperature can be from 70-200°C (note page 4 of the article, last paragraph). The target objective of 99% removal can be reached (note page 3 of the article, second full paragraph).

Sobacchi discloses that corona discharge allows for achieving high values of Destruction and Removal Efficiency (DRE), with much lower power consumption (note last page of the article, first full paragraph).

The ratio of the water spray to the exhaust gas flow is $0.25/2 = 0.125$ ml/min. This value is very close to the claimed value of “about 0.2 ml/min”, therefore, no patentable difference is seen. Furthermore, the value of “0.125” would have suggested to one of ordinary skill in the art a slightly higher value based upon a reasonable expectation of success, *In re O’Farrell*, 853 F.2d 894, 904, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988).

It would have been obvious to one of ordinary skill in the art to optimize the process conditions in Sobacchi, such as water flow rate, temperature, pulse frequency, etc. to obtain the highest removal rate at lowest power consumption.

Optionally, Makin ‘675 can be applied as stated above to teach that the presence of water spray would further facilitate the removal of methanol by scrubbing action.

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The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner can normally be reached on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/
Primary Examiner, Art Unit 1793

nmn
August 22, 2008